56. (New) A cylindrical filter of a high accuracy composed of non-woven fibrous agglomerates and comprising at least two layers of a pre-filtration layer and a precision filtration layer disposed in the direction of filtration, each of said pre-filtration layer and said precision filtration layer being formed with a non-woven fabric, at least a part of the fibers in said pre-filtration layer are bonded to each other at their contact points by heat treatment, wherein the diameter of all or part of the fibers constituting said non-woven fabric in said pre-filtration layer becomes gradually smaller toward the direction of filtration, and the diameter of fibers which account for 10% by weight or more of the fibers in the non-woven fabric in said precision filtration layer being smaller than the diameter of the fibers having a smallest diameter in said pre-filtration layer.

REMARKS

This communication is responsive to the issues raised in the Office Action of September 20, 2002. Claims 1-10, 12-35, and 37-56 are now pending.

The Office Action

Claims 11, 35, 36, and 46 were rejected under 35 U.S.C. § 112, first paragraph, as being non-enabled by the specification.

Claims 1-3, 6-20, 25-39, and 41-54 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

Claims 1-3, 9, 10, 12-20, 31-34, 37-39, 44, 45, 47-49, 53, and 54 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Szczpanski, et al.* (U.S. Patent No. 5,340,479) in view of *Pall, et al.* (U.S. Patent No. 4,726,901).

Claims 6-8, 25-30, and 41-43 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Szczpanski, et al.* ('479) in view of *Pall, et al.* ('901), and further in view of *Barboza, et al.* (U.S. Patent No. 5,591,335).

Claims 11, 35, 36, and 46 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Szczpanski, et al.* ('479) in view of *Pall, et al.* ('901), and further in view of *Miller, et al.* (U.S. Patent No. 5,275,743).

Claims 50 and 51 were held to be allowable if rewritten in independent form to overcome the rejections under 35 U.S.C. § 112, second paragraph.

Response To Rejections Under 35 U.S.C. § 112 First Paragraph

The Examiner rejected claims 11, 35, 36, and 46 under 35 U.S.C. § 112, first paragraph, as being non-enabled by the specification. Specifically, the Examiner indicates that the specification fails to adequately disclose how to form a bonded filter including a precision layer composed of glass fiber.

Applicants respectfully traverse this rejection.

A method for preparing a pre-filtration layer used in the cylindrical filter of the present invention is described in detail in the present specification at page 6, line 2 from the bottom to page 9, line 5. Particularly, in the specification at page 8, paragraph 2, lines 1 to 19 and page 9, lines 2 to 5, embodiments for forming a pre-filtration layer in which fibers are bonded each other are described.

Furthermore, the structures of precision filtration layers and methods for forming the precision filtration layers are described in the specification at page 9, line 7 to page 13, line 8. In addition, in the specification at page 9, paragraph 4, it is clearly stated that the precision filtration layer may be a layer of a non-woven fibrous agglomerate, or may be layers in which two or more kinds of non-woven fibrous agglomerates are alternately piled.

Applicants refer the Examiner to an embodiment shown in Fig. 1(a) in which a precision filtration layer is composed of a non-woven fibrous agglomerate. In the specification at page 15, paragraph 2, it is described that a non-woven fibrous agglomerate, which comprises fibers having a diameter smaller than the fibers used in pre-filtration layer 4, is wound at least 1.5 times to form precision filtration layer 3. Subsequently, a non-woven fibrous agglomerate, which comprises fibers having a diameter larger than the fibers used in the precision filtration layer 3, is wound to form pre-filtration layer 4 on the precision filtration layer 3. (In this case, a precision filtration layer is composed of only one fibrous agglomerate.)

Another embodiment in which a precision filtration layer is composed of two layers of non-woven fibrous agglomerates is shown in Fig. 1(b). In the specification at page 16, paragraph 2, it is described that a non-woven fibrous agglomerate, which has the same width as that of the non-woven fibrous agglomerate of pre-filtration layer 4 and

was prepared in a separate step so as to form precision filtration layer 3 comprising fibers having a diameter smaller than the fibers in the pre-filtration layer 4, is wound together with a non-woven fibrous agglomerate (which is the same type as that used for forming pre-filtration layer 4) so that the number of times of the winding becomes least 1.5 to form the precision filtration layer 3. Successively, only the non-woven fibrous agglomerate for forming pre-filtration layer 4 is wound to form the pre-filtration layer 4 on the precision filtration layer 3. (In this case, a precision filtration layer is composed of two kinds of fibrous agglomerates.)

Further, methods for preparing fibers themselves comprised in a precision filtration layer are described in the specification at page 10, last line to page 11, line 3. According to the description, a melt blow method or method of using glass fibers can preferably be used. In particular, when the melt blow method is used, a non-woven fibrous agglomerate in which fibers are bonded each other is readily produced as in the case of a pre-filtration layer.

Next, Example 1 of the present specification describes a method for preparing a bonded filter of the present invention. In Example 1,

i) a non-woven fabric for forming a pre-filtration layer was produced by a melt blow method in advance from a propylene copolymer and a polypropylene,

ii) a non-woven fabric used for forming a layer in a precision filtration layer was produced also by a melt blow method only from a polypropylene,

iii) a part of the melt blow non-woven fabric produced in i) above was heated at 150 °C, wound while being heated, to melt round a metal core to form a support layer,

iv) the non-woven fabric produced in ii) above was wound together with another part of the non-woven fabric produced in i) above to form a precision filtration layer,

vi) subsequently, only the remaining part of the non-woven fabric produced in i) above was wound on the precision filtration layer to form a pre-filtration layer thereby to obtain a bonded filter of the present invention.

Example 3 shows a method for preparing the same filter in the same manner as in Example 1 with the exception that a glass fiber non-woven fabric having a METSUKE of 150 g/m^2, thickness of 1,000 μm, average fiber diameter of 0.7 μm, and void ratio of 89 % (shown in Table 1) was used in place of the non-woven fabric described in ii) above. The glass fiber non-woven fabric used in Example 3 was produced by Japan Inorganic Co., Ltd. and the trade name of the fabric is "FM-2A". The glass fibers used in Example 3 were not bonded by means of heating.

In this regard, glass fibers as filter medium were already known in the public at the time when the present invention was made. Example 1 of U.S. Patent No. 5,275,743 (cited in the parent case) has disclosed the use of glass fibers as filter medium and referred to U.S. Patent No. 4,734,208 (also cited in the parent case). The '208 patent has mentioned, in turn, several commercial manufactures from which glass micro-fibers are available.

Further, the present specification at page 12, paragraph 2 discloses that in the case of melt blow non-woven fabrics, the fiber diameter and void ratio principally decide the filtration accuracy. When a glass fiber non-woven fabric is used, the average fiber diameter can be controlled to a value between 0.1 and 30μm, and the void ratio of these non-woven fabrics can be adjusted to an appropriate value by compressing these non-woven fabrics by using a calendar roll or the like.

Thus, it is submitted that a person skilled in the art can prepare a bonded filter including a precision filtration layer composed of glass fibers of the present invention based on the disclosures in the specification and drawings.

Accordingly, the present specification meets the requirements defined in 35 U.S.C. § 112, first paragraph.

In view of the above, Applicants submit that the specification provides clear support and enablement to a person skilled in the art for forming a bonded filter

including a precision layer composed of glass fiber. Reconsideration and withdrawal of the rejection are respectfully requested.

Response To Rejections Under 35 U.S.C. § 112, Second Paragraph

The Examiner rejected claims 1-3, 6-20, 25-39, and 41-54 under 35 U.S.C. § 112, second paragraph, as being indefinite.

In particular, the Examiner indicates that in claims 1 and 38, it is unclear as to whether "said one or more layers of the non-woven fibrous agglomerate" refers to the "precision filter layer".

Applicants have not amended claims 1 and 38 to recite that the non-woven fabric is in the precision filtration layer. As such, Applicants believe this addresses the Examiner's concern. Applicants submit that claims 1 and 38, along with the claims dependent therefrom, are now definite within the meaning of 35 U.S.C. § 112, second paragraph. As such, withdrawal of the rejection is respectfully requested.

Next, the Examiner rejected claims 7, 8, 27-30, 42 and 43, as being indefinite.

In particular, the Examiner indicated that the phrase "the ratio of a smallest diameter to the largest diameter of fibers in the non-woven fabric" lacks proper antecedent basis.

In response to the Examiner's concerns, Applicants have amended claims 7, 8, 27-30, 42 and 43 to recite a ratio rather than "the ratio". Applicants believe the claims now have proper antecedent basis and are definite within the meaning of 35 U.S.C. § 112, second paragraph. As such, withdrawal of the rejection is respectfully requested.

Rejection Of Claims Under 35 U.S.C. § 103(a)

The rejections under 35 U.S.C. § 103(a) all rely on the primary combination of Szczepanski, et al. (U.S. Patent No. 5,740,749) and Pall, et al. (U.S. Patent No. 4,726,901).

As will be understood from the description in the present specification at page 1, lines 6-9, and 21 to 24, and page 4, lines 7 to 10, and object of the present invention is to provide filters having a high filtration accuracy, small initial pressure loss, and long filtration life at a low production cost.

In order to achieve such object, the filters of the present invention are characterized particularly in that:

a) the filters comprise a pre-filtration layer and a precision filtration layer,

b) the fiber diameter in the pre-filtration layer becomes gradually smaller toward filtration direction,

c) the diameter of fibers in the precision filtration layer is smaller than that of fibers in the pre-filtration layer, and

d) each of the pre-filtration layer and precision layer is formed with a non-woven fabric in which at least a part of the fibers are bonded to each other by heat treatment.

As a result of diligent investigation by the present inventors, it has been found that the objects of the present invention can be achieved by disposing at least two layers of a pre-filtration layer comprising non-woven fibrous agglomerates or fabrics, constructing the pre-filtration layer so that the diameter of constituting fibers becomes finer in the direction of filtration, and constructing the precision filtration layer with a non-woven fabric comprising fibers having a smaller diameter than that of the fibers in the pre-filtration layer to accomplish the present invention.

An additional reason why characteristic b) is necessary for the present invention discussed in the present specification, for example, at page 27, lines 4 to 9. Specifically, by having the fiber in the prefiltration layer become gradually smaller toward the filtration direction, filtration can be performed without blocking of the filter surface with large particles since such filters have many spaces for capturing large particles in the upstream side.

Further reasoning for requiring the characteristic c) is discussed in detail at page 14, line 19 to page 15, line 26. Particularly, it is described at page 14, line 23 to page 15, line 3 that the formation of a fibrous agglomerate in which fiber diameter is gradually decreased in the direction of filtration only by the pre-filtration layer is difficult. More specifically, since a special spinning process is adopted in the present invention when the pre-filtration layer is prepared, it is difficult to decrease a small fiber diameter further and continuously in the pre-filtration layer.

Finally, an additional reason for requiring the characteristic d) is that when the fibers in the pre-filtration layer and precision filtration layer have no fiber-to-fiber bonding, shape stability of the layers is very low. This is an indication that the shape and size of voids in the layers are readily changed at the time of fabrication of the filter and filtration of liquid due to various types of mechanical shock, friction, compression, and vibration, leading to reduction in stability of filtration accuracy and filtration life. Sometimes, a surface portion of the pre-filtration layer becomes compact and the filter itself is deformed to reduce filtration accuracy. In order to avoid such defects, a cylindrical protection member (for example, a plastic tube), having many through holes for passing liquid, becomes necessary to place inside of the precision filtration layer as well as outside of the pre-filtration layer to maintain the shape of the cylindrical filter.

As previously mentioned, each of the rejections based upon obviousness under 35 U.S.C. § 103(a) rely on the primary combination of *Szczepanski, et al.* (U.S. Patent No. 5,340,479) and *Pall, et al.* (U.S. Patent No. 4,726,901).

Szczepanski, et al. (U.S. Patent No. 5,340,479) discloses a method for producing a coreless depth filter on a continuous basis (col. 3, lines 16 to 19). Thus, consideration has not given to the question of "filtration accuracy" at all in *Szczepanski, et al.* This indicates that the object of the Szczepanski, et al. reference is completely different from that of the present invention.

As already discussed in detail in the response submitted in the parent case, U.S. Patent No. 4,726,901 (*Pall, et al.*) is clearly distinguished from the present invention.

In contrast to the present invention which contains fiber-to-fiber bonding, fibers in Pall '901 are substantially free of fiber-to-fiber bonding and secured to each other by mechanical entanglement of intertwining. No fiber-to-fiber bonding in *Pall, et al,* '901 is repeatedly stated as follows:

> "The method of manufacturing the cylindrical fibrous structure of the subject invention comprising the steps of:
> (a) extruding synthetic, polymeric material from...
> (b) cooling the synthetic, polymeric microfibers prior to their collection on the mandrel to a temperature below that at which they bond or fuse to each other **to substantially eliminate fiber-to-fiber bonding**; and
> (c) collecting the cooled microfibers on...in the radial direction..." (column 3, line 55 to column 4, line 9); (emphasis added)

Further, at column 4, lines 10-22, it is stated:

"It is preferred, ...that cooling of the microfibers be enhanced by the injection of a cooling fluid into the stream of the microfibers prior to their impingement on the mandrel or the forming roll to assist in **eliminating fiber-to-fiber bonding**.

Additionally, it is preferred that the attenuated microfibers impinge on the forming roll which is held at a temperature substantially below the melting or softening point of the fibers..., thereby providing additional cooling and further **reducing the likelihood of undesirable fiber-to-fiber bonding**." (emphasis added)

Again, at column 7, lines 48-56, it is stated:

"(4) The temperature of the forming roll is preferably low,..., to help prevent interfiber fusing of the fibers collected on it...
(5) ...; higher rotation rates help to prevent interfiber bonding.
(6)...; higher reciprocation (or axial translation) rates help to prevent interfiber bonding." (emphasis added)

Again, at column 9, lines 10-15, it is stated:

"The preferred fibrous structure prepared by the method of the subject invention are comprised of a fibrous mass of non-woven, synthetic, polymeric microfibers which are **substantially free of fiber-to-fiber bonding**, secured to each other by mechanical entanglement or intertwining,..." (emphasis added)

Finally, at column 10, lines 4-22, it is stated:

"The term "substantially free of fiber-to-fiber bonding", as used herein,.... The microfibers are mechanically entangled or intertwined. It is this mechanical entanglement which provides the structural integrity of the fibrous mass portion of the structure. When examined under a microscope...may display random fiber-to-fiber bonding but such bonding is in an amount that would not be significantly detrimental to filter function nor contribute in any material way to the structural integrity of the filter. Additionally, it is possible, by use of tweezers, to separate out fibers which have clean, smooth profiles, free of protuberances and of inseparable clumps of fibers of the type which typically appear on fibers in structures containing substantially fiber-to-fiber bonding."

Next, in Example 11 of *Pall, et al.* '901 pointed out by the Examiner, the filter was prepared in the same general manner as in Example 10 which uses the same general procedure and apparatus as in Example 1 in turn with which the statements are presented in column 15, lines 16 to 29 as follows:

> "...with no evidence of adhesion to neighboring fibers, i.e., the profiles of the fibers were smooth with no protuberances indicating fiber-to-fiber bonding. ...water spray was used to provide enhanced cooling of the fibers, thereby assisting in minimizing undesirable fiber-to-fiber bonding. ...to provide structures substantially free of fiber-to-fiber bonding,..."

All of the statements described above undeniably indicate that the free of **fiber-to-fiber bonding is an essential requirement** in *Pall, et al.* Naturally, the fibers in the filter element in Example 11 of *Pall, et al.* are free of fiber-to-fiber bonding.

Thus, *Pall, et al.* is clearly distinguished from the present invention in that no fiber-to-fiber bonding is present as required by the present application's claims.

Further, *Pall, et al.* has already been discussed even in *Szczepanski, et al.* at col. 2, line 48 to col. 3, line 2. According to *Szczepanski, et al.*, a process for producing a depth filter of *Pall, et al.* takes time and is less stable, thereby causing variable process results (col. 2, lines 58 to 64). In other words, *Szczepanski, et al.* has obviously addressed the deficiencies of *Pall, et al.* and denied *Pall, et al.* as a potential method of addressing the problem faced by *Szczepanski, et al.*

As such, it is improper to combine *Szczepanski, et al.* with *Pall, et al.* to reach the present invention.

Further, with respect to *Szczepanski, et al.*, although the depth filter of *Szczepanski, et al.* seems to have a pre-filtration layer and a precision filtration layer (col. 3, lines 35 to 39 and col. 8, lines 32 to 40), the filter of *Szczepanski, et al.* is clearly distinguished from that of the present invention based on the facts described below:

i) According to the disclosures in *Szczepanski, et al.* with reference to drawings, when a depth filter having two layers is produced, two kinds of melted thermoplastic polymers are extruded through orifices 25, 25 and 42, 42, respectively. The extruded polymers are attenuated by gas attenuating mechanisms 28, 28 and 44, 44, respectively, to form continuous filaments. The filaments thus formed are collected on rotating mandrel 55. As sufficient filaments are built up on the mandrel 55, press roll 56 forces finished filter element 59 off the axial end of mandrel 55 in the direction of arrow 53 (Fig. 2) to produce continuous filter element 59 of indefinite length (col. 6, lines 34 to 39).

ii) Although arrow 53 is not shown in Fig. 2 or other figures, it is supposed that finished filter element 59 is pushed from the right hand side to the left hand side of the drawing to form an indefinite length of a filter. The correctness of this presumption is supported by the statement in col. 9, lines 39 to 44 that as the filter element is moved axially along the rotating mandrel 55 by the press roll 56 in the direction 57* (Fig. 2), the filaments 52, 52 are laid and collected on top of the previously collected filaments 51, 51, thereby forming the outer or filtering layer *(Referential numeral "57" seems to be a typographical mistake since "57" is the axis of press roll 56 in Fig. 2.)*

iii) Accordingly, when two delivery systems 14 and 16 are used in *Szczepanski, et al.*, only two kinds of filaments having different diameters are formed, and even when the diameters are changed, the change is caused only in the axial direction of the mandrel. Thus, the depth filter of *Szczepanski, et al.* is clearly distinguished from the filter of the present invention. Specifically speaking, a filter comprising a pre-filtration layer in which the diameters of fibers are gradually reduced in the direction of filtration (radial direction) cannot be produced by *Szczepanski, et al.*

Accordingly, the filter of high accuracy of the present invention would not have been obvious to a person of ordinary skill in the art from *Szczepanski, et al.* and *Pall, et al.* taken alone or in combination with each other.

CONCLUSION

As will be understood from the foregoing, the specification and claims of the present application meet the requirements defined in 35 U.S.C. § 112, and the present invention is not obvious from *Szczepanski, et al.* and *Pall, et al.* taken alone or in combination with each other. Thus, the present application is now believed to be in condition for allowance.

Applicants believe this communication to be fully responsive to the outstanding rejection. Reconsideration and withdrawal of the rejections and notification of allowability are earnestly solicited. The Examiner is encouraged to contact the undersigned should any issues remain.

Respectfully submitted,

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I hereby certify that this Amendment and Response Under 37 CFR § 1.111 and **accompanying documents** are being deposited with the United States Postal Service "Express Mail Post Office to Addressee" Service on the date indicated above and addressed to the Assistant Commissioner For Patents, Washington, D.C. 20231.

Lynda S. Kalemba

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VERSION OF SPECIFICATION AND AMENDED CLAIMS WITH MARKINGS TO SHOW CHANGES MADE

In the Specification:

Please replace the paragraph beginning at page 12, line 3 with the following new paragraph:

Usually, the fiber diameter of either [a] melt-blow non-woven fabrics and glass fiber non-woven fabrics is not constant, but distributed in a certain degree of range, and the filtration accuracy is decided principally by their average fiber diameter and void ratio in the case of those non-woven fabrics. Accordingly, when the fiber diameter of a melt-blow non-woven fabrics or glass fiber non-woven fabrics is described hereinafter, the term "fiber diameter" is intended to mean the average fiber diameter unless otherwise specified. When a melt-blow non-woven fabric is adopted, it is possible to control the average fiber diameter to a value between 0.5 and 40μm by the selection of spinning conditions. When a glass fiber non-woven fabric is used, the average fiber diameter can be controlled to a value between 0.1 and 30μm. Void ratio of these non-woven fabrics can be adjusted to an appropriate value by compressing these non-woven fabrics by using a calendar roll or the like.

Please replace the paragraph beginning at page 16, line 4, with the following new paragraph:

In order to produce the cylindrical filter shown in Figure 1(b), a method disclosed in Japanese Patent Publication No. Sho 56-49605 can be used. In this case, a non-woven fibrous agglomerate composed of hot-melt adhesive fibers is used as a non-woven fibrous agglomerate for forming pre-filtration layer 4. As an example, a non-woven fibrous agglomerate composed of a high melting point resin and a low melting point resin having a difference in melting point of more than 10 °C can be mentioned. While this non-woven fibrous agglomerate is used as the material for pre-filtration layer

4, it is also used as a material for support layer. First, a non-woven fibrous agglomerate which forms [precision] pre-filtration [filtration] layer 4 is heated in advance at a temperature higher than the hot-melt adhering temperature of the non-woven fibrous agglomerate, and wound round a suitable winding core to form support layer 2. Thereafter, a non-woven fibrous agglomerate, which has the same width as that of the non-woven fibrous agglomerate of pre-filtration layer 4 and was prepared in advance so as to form precision filtration layer 3 comprising fibers having a diameter smaller than that of the fibers having a smallest diameter in a pre-filtration layer, is wound together with the non-woven fibrous agglomerate for forming the pre-filtration layer so that the number to times of the winding becomes at least 1.5 to form precision filtration layer 3, and then successively winding only the non-woven fibrous agglomerate for forming the pre-filtration layer thereon to form prefiltration layer 4 in which fiber diameter is gradually decreased in the direction of filtration. When the number of winding of the non-woven fibrous agglomerate for forming precision filtration layer 3 is less than 1.5 times, a sufficient filtration accuracy can hardly be attained since the thickness of the precision filtration layer is small. The place at which the non-woven fibrous agglomerate for forming precision filtration layer 3 is wound is the position where the ratio of the thickness of pre-filtration layer 4 to that of support layer (thickness of pre-filtration layer/thickness of support layer) becomes 0.5 to 4 and preferably 0.7 to 4. When the thickness of the pre-filtration layer becomes more than 4 times as large as the thickness of the support layer, the strength of the support layer becomes insufficient. On the other hand, when it becomes smaller than 0.5 times, the accumulation in the pre-filtration layer becomes small and thus it becomes difficult to lengthen the filtration life of filters. Thereafter, they are cooled, a winding core is pulled out, and flat gaskets 6a and 6b are stacked on both ends to complete the production of a filter of the present invention.

Please replace the paragraph beginning at page 18, line 24, with the following new paragraph:

Fig. 3 is diagrammatic representation showing examples of the pattern of change of fiber diameter in the direction of filtration, that is, at the layers between A and B, from the upstream to the downstream in a cross-section of such a filter as shown in Fig. 1 or Figure 2. Whereas when two or more kind of non-woven fibrous agglomerates are piled alternatively, the diameter of the fibers in a precision filtration layer [y] becomes discontinuous, the diameter of the fibers of a non-woven fibrous agglomerate comprised in a precision ration layer and having a diameter smaller than that of the fibers having a smallest fiber diameter in a pre-filtration layer is indicated herein as representative value.

Please replace the paragraph beginning at page 23, line 3, with the following new paragraph:

Example 3

As the non-woven fibrous agglomerate for forming a pre-filtration layer, the same non-woven fibrous agglomerate as used in Example 1 was used. As the non-woven fibrous agglomerate for forming [a precision filtration layer] the polypropylene non-woven fabric used for forming the precision filtration layer in Example 1, a glass fiber non-woven fabric (Trade name: FM-2A, produced by Japan Inorganic Co., Ltd.) having a METSUKE of 150g/m^2, thickness of 1,000μm, and average fiber diameter of 0.7μm was used. These fabrics were molded by the same manner as in Example 1 into a cylindrical filter having an outside diameter of 70mm, inside diameter of 30mm, and overall length of 250mm, and provided with flat gaskets. The characteristics and performances of the filter thus obtained are shown in Table 1.

Please replace Table 1 beginning at page 28, with the following new Table 1:

Table 1

	Prefiltration Layer			
	Material	Maximum fiber diameter (μm)	Minimum fiber diameter (μm)	Void ratio (%)
Example 1	PP + propylene copolymer	15	2	89
Example 2	PP + propylene copolymer	15	2	89
Example 3	PP + propylene copolymer	15	2	89
Example 4	PP + propylene copolymer	20	3	89
Example 5	PP + propylene copolymer	20	3	89
Example 6	PP	15	2	89
Example 7	PP + propylene copolymer	15	2	89
Example 8	PP + propylene copolymer	15	2	89
Comparative Example 1	PP + propylene copolymer	15	2	89
Comparative Example 3	PP + propylene copolymer	25	(25)	75
Comparative Example 4	PP + propylene copolymer	15	2	70

	Precision Filtration Layer			Filter Performances			
	Material	Fiber diameter (μm)	Void ratio (%)	Filtration Accuracy	Initial pressure loss (kg/cm^2)	Filtration life (min)	Pressure resistant strength (kg/cm^2)
Example 1	PP	1	59	1	1	44	10 <
Example 2	PP	1	95	2	0.3	61	10 <
Example 3	Glass	[1] 0.7	93	2	0.3	66	10 <
Example 4	PP	1	95	3	0.1	110	10 <
Example 5	PP	1	95	3	0.1	220	10 <
Example 6	PP	1	59	1	1	59	10 <
Example 7	PP	1	59	1	1	44	10 <
Example 8	PP	1	59	1	1	42	10 <
Example 9	PP	1	59	1	1	46	10 <
Comparative Example 1	Not-used	-	-	4	0.3	66	10 <
Comparative Example 3	PP	1	95	5	0.1	11	10 <
Comparative Example 4	PP	3	59	2	0.5	48	10 <

In the Claims:

Please replace claims 1, 7, 8, 27-30, 35, 38, 42, 43, and 46 with the following amended versions thereof:

1. (Amended) A cylindrical filter of a high accuracy composed of non-woven fibrous agglomerates and comprising at least two layers of a pre-filtration layer and a precision filtration layer disposed in the direction of filtration, [each of] said pre-filtration layer [and said precision filtration layer] being formed with a non-woven fabric, in which at least a part of the fibers are bonded to each other at their contact points by heat treatment, wherein the diameter of all or part of the fibers constituting said [nonwoven] non-woven fabric in said pre-filtration layer becomes gradually smaller toward the direction of filtration, said precision filtration layer comprising one or more layers of [the] [nonwoven] non-woven [fabric] fabrics, and the diameter of fibers which account for 10% by weight or more of the fibers in said one or more layers of the non-woven [fabric] fabrics in said precision filtration layer being smaller than the diameter of the fibers having a smallest diameter in said pre-filtration layer.

7. (Amended) The filter of a high accuracy according to claim 1 wherein [the] a ratio of a smallest diameter to a largest diameter of fibers in the non-woven fabric of said pre-filtration layer is 1:2 to 1:10.

8. (Amended) The filter of a high accuracy according to claim 1 wherein [the] a ratio of the diameter of fibers in one of the non-woven [fabric] fabrics of said precision filtration layer, which comprises fibers having a diameter smaller than that of fibers having a smallest diameter in said pre-filtration layer, to a smallest diameter of the fibers in said pre-filtration layer is 1:1.1 to 1:20.

27. (Amended) The filter of a high accuracy according to claim 12 wherein [the] a ratio of a smallest diameter to a largest diameter of fibers in the non-woven fabric of said pre-filtration layer is 1:2 to 1:10.

28. (Amended) The filter of a high accuracy according to claim 13 wherein [the] a ratio of a smallest diameter to a largest diameter of fibers in the non-woven fabric of said pre-filtration layer is 1:2 to 1:10.

29. (Amended) The filter of a high accuracy according to claim 12 wherein [the] a ratio of the diameter of fibers in one of the non-woven [fabric] fabrics of said precision filtration layer, which comprises fibers having a diameter smaller than that of fibers having a smallest diameter in said pre-filtration layer, to a smallest diameter of the fibers in said pre-filtration layer is 1:1 to 1:20.

30. (Amended) The filter of a high accuracy according to claim 13 wherein [the] a ratio of the diameter of fibers in one of the non-woven [fabric] fabrics of said precision filtration layer, which comprises fibers having a diameter smaller than that of fibers having a smallest diameter in said pre-filtration layer, to a smallest diameter of the fibers in said pre-filtration layer is 1:1 to 1:20.

35. (Amended) The filter of a high accuracy according to claim 12, wherein [the non-woven fabric of said precision filtration layer, which comprises fibers having a diameter smaller than that of the fibers having a smaller diameter in said pre-filtration layer, comprises glass fibers] the non-woven fabric, other than the non-woven fabric in said prefiltration layer, comprises glass fibers.

38. (Amended) A cylindrical filter of a high accuracy composed of non-woven fibrous agglomerates and comprising at least three layers of a pre-filtration layer, a precision filtration layer, and a support layer disposed in the direction of filtration, said pre-filtration layer being formed with a non-woven fibrous agglomerate prepared by a melt-blow process, and the diameter of all or part of the fibers constituting said non-woven fibrous agglomerate in said pre-filtration layer becomes gradually smaller toward the direction of filtration, said precision filtration layer comprising one or more [layers of a] non-woven fibrous [agglomerate] agglomerates, and the diameter of fibers which account for 10% by weight or more of the fibers in said one or more [layers of the] non-

woven fibrous [agglomerate] agglomerates in the precision filtration layer being smaller than the diameter of the fibers having a smallest diameter in said pre-filtration layer, and said support layer being formed with a non-woven fibrous agglomerate in which at least a part of the fibers are bonded by heat treatment, and the diameter of the fibers constituting said non-woven fibrous agglomerate in said support layer is larger than the diameter of the fibers in said precision filtration layer.

42. (Amended) The filter of a high accuracy according to claim 38 wherein [the] a [ration] ratio of a smallest diameter to a largest diameter of fibers in the non-woven fibrous agglomerate of said pre-filtration layer is 1:2 to 1:10.

43. (Amended) The filter of a high accuracy according to claim 38 wherein [the] a ratio of the diameter of fibers in one of the non-woven fibrous [agglomerate] agglomerates of said precision filtration layer, which comprises fibers having a diameter smaller than that of fibers having a smallest diameter in said pre-filtration layer, to a smallest diameter of the fibers in said pre-filtration layer is 1:1 to 1:20.

46. (Amended) The filter of a high accuracy according to claims 38 wherein one of the non-woven fibrous [agglomerate] agglomerates of said precision filtration layer, which comprises fibers having a diameter smaller than that of the fibers having a smaller diameter in said pre-filtration layer, comprises glass fibers.

Please insert the following new claims 55 and 56 into the application:

55. (New) The filter of a high accuracy according to claim 1 wherein said precision filtration layer comprises the same type of a non-woven fabric as that used in said pre-filtration layer and a non-woven fabric other than the non-woven fabric used in said pre-filtration layer.

56. (New) A cylindrical filter of a high accuracy composed of non-woven fibrous agglomerates and comprising at least two layers of a pre-filtration layer and a precision filtration layer disposed in the direction of filtration, each of said pre-filtration layer and said precision filtration layer being formed with a non-woven fabric, at least a part of the fibers in said pre-filtration layer are bonded to each other at their contact points by heat treatment, wherein the diameter of all or part of the fibers constituting said non-woven fabric in said pre-filtration layer becomes gradually smaller toward the direction of filtration, and the diameter of fibers which account for 10% by weight or more of the fibers in the non-woven fabric in said precision filtration layer being smaller than the diameter of the fibers having a smallest diameter in said pre-filtration layer.